

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**COURSE OUTLINE**

**COURSE TITLE:** DRAFTING AND BLUEPRINT READING  
**CODE NO. :** DRF105 **SEMESTER:** 1  
**PROGRAM:** Mechanical Techniques-AVIATION  
**AUTHOR:** TIM CANDIDO  
**DATE:** 01-06-11 **PREVIOUS OUTLINE DATED:** 99-06-08  
**APPROVED:**

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**DEAN**

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**DATE**

**TOTAL CREDITS:** 3  
**PREREQUISITE(S):**  
**HOURS/WEEK:** 3

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*For additional information, please contact Kitty DeRosario, Dean,  
School of Technology, Engineering and Technical Trades Programs,  
(705) 759-2554, Ext. 642*

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Course Name

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Code No.

## I. COURSE DESCRIPTION:

In a hands-on environment students will learn blueprint reading, geometric dimensioning and tolerancing (G.D. & T.), and be introduced to AutoCAD. The course will commence with skill development in blueprint reading. These skills shall be applied to the machinist's trade and related areas. New information has been added to explain computer-aided design, new dimensioning practices, and assembly drawing interpretation. Using common shop terminology, industrial prints will be interpreted. G.D. & T. includes reading dimensional drawings in fractions, decimals, and in metric units. AutoCAD 2000 is taught so that upon completion students can create computerized, mechanical drawings.

## II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain terminology and describe different views of drawings.  
Potential Elements of the Performance:
  - Explain the advantages of computer aided design and drafting
  - Demonstrate how to reproduce drawings
  - Explain the purpose of a title block and the contents thereof
  - Discuss the meaning of the information generally specified in the title block
  - Discuss what is contained in a parts list
  - Explain why multiple views may be required
  - Demonstrate how multiple views are projected
  - Illustrate the most common principle views
  - Explain the meaning of a working drawing
  - Review the placement and relation of views of drawings
  - Show that a one-view drawing may be sufficient to describe the shape of an object
  - Explain the meaning of the abbreviation CDS
  - Demonstrate that often only two views are necessary to completely describe an object
  - Show the method of representing curved surfaces on a mechanical drawing as projected from a circular view
  - Show how to dimension cylindrical parts
  - Explain why three-view drawings are used
  - Describe the relationship of the top, front, and right-side views
  - Discuss angles of orthographic projection and illustrate ISO projection symbols
  - Describe auxiliary views and why they are required
  - Describe the difference between primary and secondary auxiliary views
  - Discuss why secondary auxiliary views are required.

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Course Name

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Code No.

2. Recognize dimensioning techniques and sectional views.

Potential Elements of the Performance:

- Define what dimensions are required on a drawing
- Show the general location of dimensions on a drawing
- Point out the application of fractional dimensions
- Define tolerancing
- Explain the reasons for what is meant by “fractional tolerances” and “limits”
- Discuss the mathematical basis of decimal fractions
- Discuss the application of decimal dimensions to a working drawing
- Define point-to-point dimensioning and datum or baseline dimensioning
- Apply tolerances to decimal dimensions
- Discuss the basis of the system of angular measurement
- Show how to dimension angles
- Apply tolerance to angular dimensions
- Explain the need for metric dimensioning
- Explain the International System of Units (SI)
- Define the basic metric units used on industrial drawings
- Explain the use of dual dimension
- Explain the purpose for which sectional views are used
- Show the symbols for section lining used to represent steel and cast iron
- Show the purpose for which half-section views are used
- Demonstrate the use of the cutting plane for half sections
- Show the methods used to dimension equally spaced and unequally spaced holes
- Show the methods used to dimension drilled, reamed, and bored holes
- Show the methods used to dimension drilled, reamed and bored holes
- Describe the differences between drilled, reamed, and bored holes
- Discuss the reasons for changes on drawings
- Show how alterations and changes in sizes and specifications made on the drawing are recorded

3. Detect special notes on drawings and identify relevant information that is required to manufacture a part from the drawings.

Potential Elements of the Performance:

- Explain the use of countersunk, counterbored and spot-faced holes
- Review the method of specifying sizes of countersunk, counterbored and spot-faced holes
- Explain the use of fillets and rounds
- Explain the use of tee slots and dovetail slots in machine construction
- Explain the meaning of machining symbols
- Explain the application of bosses and pads
- Explain the meaning and application of tapers
- Explain the differences between tapers, chamfers and bevels
- Show how a chamfer is represented and dimensioned
- Demonstrate the application of necks
- Show how necks are dimensioned
- Explain the types of knurls and their uses
- Show how knurls are dimensioned

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Course Name

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Code No.

Potential Elements of the Performance continued.....

- Explain the purpose of keyseats
  - Illustrate the different types of keys and their uses
  - Explain the reason for using a flat on a shaft
  - Explain the system used to “call out” thread specifications, thread form, and thread series
  - Explain the types of fits and their uses
  - Show the pictorial, schematic and simplified methods for thread representation
  - Demonstrate how tapped holes are represented
4. Utilize various assembly drawings required to show the finished product when assembled and
- Potential Elements of the Performance:
- Explain the purpose of assembly drawings
  - Show the difference between detail and assembly drawings
  - Describe the use of balloons
  - Demonstrate methods of identifying details on an assembly drawing
5. Identify and name geometric dimensioning and tolerancing symbols and their interpretation on drawings.
- Potential Elements of the Performance:
- Identify the various symbols
  - Specify former symbols
  - Recognize feature control frame
  - Use material condition symbols (maximum, least, and r.f.s. material conditions)
  - Identify basic dimension symbols, datum feature symbols, and combined symbols
  - Explain datum target symbols
6. Use symbols and material conditions to calculate form tolerances.
- Potential Elements of the Performance:
- Calculate straightness tolerances
  - Calculate flatness tolerances
  - Calculate circularity tolerances
  - Calculate cylindrical tolerances
7. Set up and print drawing using AutoCAD V.14.
- Potential Elements of the Performance:
- Use AutoCAD's introductory features
  - Plan, start and setup a drawing
  - Use grids, drawing lines, drawing aids, and templates to create drawings
8. Draw and print with AutoCAD.
- Potential Elements of the Performance:
- Edit, draw, layer, and erase objects in AutoCAD
  - Print and/or plot a drawing
  - Draw basic shapes like circles, arcs, and rectangles
  - Use object snap and construction lines to create multi-view drawings
  - Incorporate text on drawings

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 Course Name

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 Code No.

9. Edit the drawing.

Potential Elements of the Performance:

- Use basic editing commands
- Change properties of an object
- Obtain information about the drawing
- Manage AutoCAD file types
- Use basic dimensioning practices

### III. TOPICS:

1. Elementary Blueprint Reading
2. Geometric Dimensioning and Tolerancing-Theory text book
3. AutoCAD 2000

### IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

*Elementary Blueprint Reading for Machinist 4<sup>th</sup> edition*, David L. Taylor, Delmar  
 Scientific Calculator – Recommended Sharpe EL-531-L Advanced DAL  
 Pencil/Ruler  
 2-3.5" (1.44) Formatted Floppy Disk (New Disk)  
 Introduction To Autocad 2000 – Prentice Hall

### V. EVALUATION PROCESS/GRADING SYSTEM:

Quizzes and Assignments	50%
Tests and Projects	30%
Attendance	20%

Drafting and Geometric Dimensioning and Tolerancing 66%  
 Auto Cad 34%

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies &amp; Procedures Manual - Deferred Grades and Make-up</i> ).	
NR	Grade not reported to Registrar's office. This is used to	

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Course Name

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Code No.

facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.

## **VI. SPECIAL NOTES:**

### Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

### Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

## **VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

## **VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.